

OBSERVATIONS ON SOME HEMIPTERA/HETEROPTERA OF MACAU, SOUTHEAST ASIA

EMMET R. EASTON AND WING-WAH PUN

(ERE) University of Macau, P.O. Box 3001, Macau via Hong Kong; (WWP) Departamento de Serviços Agrários de Camara Municipal das Ilhas, Coloane, Macau.

Abstract.—The insect species of Macau are believed to be quite diverse in numbers of species due to trees and foliage representing the subtropical evergreen broadleaf forest as well as remnants of the monsoon tropical rain forest. The absence of land under agricultural production may account for the low numbers of some groups that are more common in the temperate regions of the world such as the Anthocoridae, Miridae, or Lygaeidae. Records of 59 species of true bugs are listed for the Portuguese territory of Macau of which 32 are considered new records.

Key Words: Macau, Hemiptera, Heteroptera, faunal list

The true bugs locally have been little studied since the time of J. C. W. Kershaw who lived in Macau for seven years and published a series of papers on local hemiptera and homopteran fauna (Kershaw and Kirkaldy 1908a, b, 1909a, b, c). The territory of Macau consists of a peninsula of land connected to the Guangdong Province of mainland China as well as two islands consisting of Taipa and Coloane which are connected to the peninsula either by bridges (Taipa, 2) or a causeway (Coloane). It is most likely that Kershaw carried out his observations on Macau insects on the peninsular area as road access to the islands was not available until 1974. Since that time urbanization has eliminated most of the agricultural habitats on the land area connected to mainland China and the majority of our records concern fauna of the islands where the urbanization process has been less intensive. Notes are provided in this paper on certain species in families the authors have observed in Macau over the course of years from 1989 to the present.

MATERIALS AND METHODS

Insects were sampled during all months of the year from an artificial light source built in 1994 at the entrance of the inner harbour on the Macau peninsula. The presence of 18 high intensity lamps (1800 watt) illuminating the 40 metre tall granite Friendship monument accounted for the fair number of records of which *Nezara viridula* (L.) (Pentatomidae) was found to be the most abundant species present. Other species were collected from the walls of buildings (Taipa island) that are normally illuminated at night while those species not sensitive to light were sampled from trees and shrubs upon visual examination. Names of the plant hosts follow the Macau Catalogue of Plants (Câmara Municipal das Ilhas, Macau and Instituto de Investigação Científica Tropical, Lisboa 1991). Representatives of the species of Hemiptera named here are housed in the entomology museum of the Agrarian Services on Coloane island under the curatorship of the second author.

LIST OF SPECIES

HEMIPTERA

Acanthosomatidae

Dichobothrium nubilum (Dallas). 12 April 1994, Ip Tai leg, NEW RECORD, Coloane Island. In mainland China it is found in Hainan, Guangdong, Guangxi, Hunan, Sichuan Provinces as well as Tibet; also India, Taiwan and Japan.

Elasmotherus nobilis (Dallas). 18 April 1996, ERE leg, NEW RECORD, Friendship monument on Macau peninsula Also found in Hong Kong according to Tai Lung farm records.

Belostomatidae

Diplonychus rusticum F., small water bug. 18, 23, 25, 28, 30 May; 1, 12 June, 25 Aug. 1996, ERE leg, Friendship monument, Macau peninsula; male with eggs, Leung-va leg, Coloane island, NEW RECORD. Found in pond on reclaimed land. In Hong Kong Dudgeon and Corlett (1994) report it common in slow moving streams and marshes. It is found in India, Burma, Sri Lanka, Malaya, Sumatra, Java and Thailand as well as Australia.

Lethocerus indicus (Lepelletier and Serville), giant water bug. 24 Jan.; 10 June 1994; 5 May; 10, 19 June 1995; 19 June 1996, ERE leg, NEW RECORD, Macau peninsula. Hoffman (1933) studied its life history in Guangzhou; eggs were laid on upright vegetation in ponds. At lengths ranging from 60–80 mm it is the largest hemipteran known. Widespread in China it is also found in Burma, Sri Lanka, India, Java, Sumatra, Malaya and the Philippines.

Coreidae

Acanthocoris scaber (L.), brown coreid bug. 11 July 1994, Cheong Chi Keong leg, NEW RECORD, Coloane Island, ex *Cap-sicum frutescens*, *Ipomeae batatas*, *Lycopersicum esculatum* and eggplant, *Solanum melongena*. Hoffman (1931a) reported it damaging eggplant, squash and peppers in

the Guangzhou area of SE China. Reported also in India.

Cletus trigonus (Thunberg), slender rice bug. 19 Sept. 1993. PWW leg, NEW RECORD, Coloane Island, ex *Amaranthus tri-color*, Chinese spinach. In addition to Guangdong Province of China it also occurs in India, Sri Lanka, Borneo and Philippines.

Gralliclava horrens (Dohrn), Oriental pod bug. 17 Aug. 1993, Ip Tai leg, NEW RECORD, Coloane Island, ex *Arachis hypogaea*, groundnut. Dolling (1978) revised the group and reported it from Hong Kong, India, China (Fukien, Hainan), Burma, Thailand, Borneo, Sulawesi, Philippines and Taiwan.

Homeocerus unipunctatus Dallas. Date, collector unknown. NEW RECORD, Coloane island, ex *Glycine max*, *Phaseolus radiatus*, vetch. Wu (1935) reported it also in India, Sri Lanka, Burma, Malaya and Java.

Leptocoris acuta (Thunberg), coreid rice bug. 12, 19 Nov. 1994, ERE leg, Friendship monument, Macau peninsula. It was reported earlier from Taipa island (Easton 1992). Sands (1977) recorded it from Southern Japan, Taiwan, Hong Kong, Vietnam, India, Pakistan, Thailand, Indonesia to Papua New Guinea, Samoa, Fiji and Australia.

Mictis tenebrosa F., cassia bug. 9 Aug. 1992, Ng Wai Man leg, NEW RECORD, Coloane Island, ex *Arachis hypogaea* and *Smilax china*, greenbrier. In Hong Kong there are records from *Cassia fistula* (Lee and Winney 1981). O'Shea and Schaefer (1980) reported it from India, Burma, Malaya and Indonesia as well as China.

Notobitus meleagris (F.), bamboo coreid or leaf-footed bug. 11 Oct. 1992, Ng Wai Man leg, Coloane island; 2 nymphs, 12 adults, 30 Aug 1995, ERE leg, ex *Dendrocalmus pulverulentus* bamboo in Lou Lim Iok gardens, Macau peninsula. Reported also in Hainan, China as well as India, Malaya and Hong Kong.

Paradasynus spinosus Hsiao, green cor-

eid bug. 10 Nov. 1992, PWW leg, NEW RECORD, Coloane Island. In Hong Kong it has been found on *Citrus sinensis* and *Melia azedarach* (Lee and Winney 1981) and Hill et al (1982) observed the nymphs clustering on plant leaves.

Riptortis linearis (F.) 26 July 1995, J. Santos leg, NEW RECORD, Coloane Island. ex *Phaseolus radiatus* and *P. vulgaris*, kidney bean. Wu (1935) reported it from the Guangdong region of China as well as India, Sri Lanka, Burma and Malaya.

Cydnidae

Adrisa magna (Uhler), black burrowing bug. 12, 13 March; 3, 27 April 1994, ERE leg, NEW RECORD, Friendship monument, Macau peninsula. It is also recorded from Northeast India Burma and Hong Kong.

Dinidoridae

Cyclopelta obscura (Lepelletier and Serville). 22 Sept. 1992 Ng Wai Man leg, NEW RECORD, Coloane Island, ex *Canavalia gladiata*, sword bean and *Cercis chinensis*, Chinese redbud. Distribution is India, Burma, Cambodia, Laos, Vietnam, Indonesia, Malaysia, Philippines and China (Durai 1987).

Megymenum inerme (Herrich-Schaeffer). 1 Aug. 1994, Ng Wai Man leg, Coloane Island. Originally reported in Macau by Kershaw (in Kirkaldy 1910). Also found in India, Sri Lanka Vietnam, Thailand and Guangxi, Guangdong, Hebei and Yunnan provinces of China.

Gerridae

Aquarius paludum (F.). Summer 1993, ERE and Leung-va leg, NEW RECORD, Coloane Island in pond on reclaimed land at Siac Pai Van; 21 Aug. 1996, Friendship monument, Macau peninsula attracted to lights. Chen and Andersen (1993) report it from most provinces of China and it is believed to range across Eurasia from Britain to Japan. These authors also reported another species in Macau, namely *Limnagon-*

us fossarum (F.) but we did not collect it in this study.

Largidae

Physopelta gutta Burmeister. 28 Oct. 1992, Cheong Chi Kong leg, Coloane island; 13 Feb.; 16, 27 March; 3, 6, 12 April 1994, ERE leg, Friendship Monument, Macau peninsula attracted to light. On the island of Taipa and in neighboring Hong Kong it has been noted (Easton 1992) feeding on the seeds of the turn-in-the-wind tree, *Mallotus paniculatus*, that mature during the colder months of the year. Mating was observed on the trunk of this tree and all immature stages noted on the tree foliage at this time. It is apparently widespread in South East Asia found in Sri Lanka, India, Burma, Vietnam, Bangladesh, Indonesia, China (Guangdong, Hunan, Sichuan, Yunnan provinces), Tibet, Philippines, Taiwan and east to Australia.

Lygaeidae

Horridipamera nietneri (Dohrn). 13 Aug. 1996, ERE leg, NEW RECORD, Friendship Monument, Macau peninsula. In India, Mukhopadhyay (1988) reported it from grass and litter of *Ficus* species. It is also found in the Guangdong Province of China and reported as far southeast as Australia.

Metochus abbreviatus (Scott). 24 Aug. 1992, Cheong Pak Fai leg, Coloane Island; 10 Nov 1990, ERE leg, Taipa Island NEW RECORD ex *Camellia oleifera*, oil tea and *Vernicia montana*, wood-oil tree. It is commonly attracted to lights. Distributed in India, China (Hunan, Guangxi, Jiangxi, Sichuan) Taiwan and Japan.

Metochus uniguttatus (Thunberg). 28 March 1996, ERE leg, Friendship monument, Macau peninsula. Easton (1992) reported it from a building that had been illuminated at night on the island of Taipa. There are also specimens collected from Hong Kong at the Tai Lung farm experimental station near Sheung Shui.

Paromius exiguus (Distant). 13 Aug. 1996, ERE leg, NEW RECORD, Friend-

ship monument, Macau peninsula attracted to lights. Distribution includes India (Mukhopadhyay 1988).

Thunbergia sp. 27 July 1991, ERE leg, Taipa island, attracted to lights on the university campus.

Nabidae

Nabis stenoferus Hsiao. 15 Aug. 1992, PWW leg, NEW RECORD Coloane island. Also distributed in Hunan, Jilin, Shanxi, Shandong and Yunnan provinces of China.

Notonectidae

Enithares biimpressa (Uhler). 6 June 1992, ERE leg, NEW RECORD, Coloane island from small stream emerging from mine shaft in ravine above Choec-van village. It has been previously only reported from Hong Kong (D. Polhemus, personal communication).

Pentatomidae

Calliphara nobilis (L.), blue shield bug. 15 Aug. 1991, ERE leg, ex *Ficus* sp. near entrance of mine shaft above Choec-van village feeding on fruit. It was first reported in Macau by Kirkaldy (1910). Distribution includes Hong Kong, Borneo, Burma, Malaysia, Java, Taiwan and the Philippines.

Cantao ocellatus (Thunberg). 5 Nov. 1994, ERE leg, Friendship monument, Macau peninsula. Easton (1991) reported numerous individuals on the island of Taipa resting and mating during winter months on the fruit and among foliage of *Mallotus paniculatus* (Euphorbiaceae). Eggs and nymphs have not been observed in this study nor in nearby Hong Kong where similar behaviour has been reported but in India, parental care has been noted (Ayyar 1920) and feeding occurred on the tender leaves and fruit of *Trewia nudifolia* (Euphorbiaceae), a plant not found in this area. The insect furthermore in India was observed congregating on the branches and so believed to be important in the pollination of the moon tree, *Macaranga roxburghii* (Schuh and Slater 1995), another plant species not believed to occur

locally or in Hong Kong. It is believed to be distributed in Bhutan, Thailand, Burma, Borneo, Java, Vietnam, Sumatra, Malaysia and the Philippines as well as Taiwan and southern Japan.

Chrysocoris stollii (Wolff). 7 July 1994, Cheong Chi Kong leg, NEW RECORD, Coloane Island, ex *Glochidium* and *Schima superba*. Kershaw reported it first from Macau (in Kirkaldy 1910). It is also found in Hong Kong, India, Java, Sumatra and the Kwangsi province of China. Another species *Chrysocoris grandis* (Thunberg), large white shield bug was collected by J. C. Kershaw 1910, but not found in the present study.

Dalpada oculata (F.). 27 April 1993, Cheong Pak Fai, leg, Coloane Island, ex *Cunninghamia lanceolata* and *Paulownia fortunei*. Kershaw reported it originally (in Kirkaldy 1910) It is also found in the Hainan province of China as well as in India, Burma, Malaysia and Hong Kong.

Eocanthecona concinna (Walker). Hoffman (1935) listed it from both Hong Kong and Macau but it was not observed in the present study.

Eocanthecona furcellata (Wolff) grey stink bug. 19 Aug. 1991, ERE leg, NEW RECORD, Taipa island. A predaceous asopine that feeds by inserting its stylets into soft-bodied lepidopterous larvae. A mass rearing technique has been developed to control cutworms in Thailand (Napompeth 1992), and, in Hong Kong, it has been observed feeding on the fall armyworm. Distribution includes India, Sri Lanka, Bangladesh, Burma, Java, Taiwan, China to Japan (Thomas 1994).

Erthesina fullo (Thunberg), yellow spotted stink bug. A common species locally observed feeding on the trunks and stems of *Casuarina equisetifolia* trees where mating and oviposition take place by cementing two or more leaves together (Easton 1993). First reported locally by Kershaw and Kirkaldy (1909c) who described the immature stages and provided biological notes. In the Guangzhou area of China, Hoffman (1930)

reported it feeding upon 30 species of trees of which the tallow tree, *Sapium sebiferum* was the first choice followed by the China-berry, *Melia azedarach* and *C. equisetifolia*. Its distribution includes India (Assam), Sri Lanka, Burma (or Myanmar), Malaysia, Java, Hong Kong, Taiwan and Japan.

Halyomorpha picus (F.). 1 Aug. 1991, ERE leg, Taipa Island. Hoffman (1931a) reported it as a pest of *Vigna sesquipedalis* yard-long bean and *Phaseolus lunatus*, lima beans near Guangzhou, China. We believe Kershaw (in Kirkaldy 1910) was the first to report it from Macau. It also occurs in Hong Kong according to specimens at the Tai Lung Experimental Station. Its distribution includes India, Sri Lanka, Burma, Vietnam, Malaysia and Taiwan as well as Guangdong province of China.

Megarrhamphus hastatus (F.). 10 May 1997, ERE leg, Taipa Island hiking trail, Ex *Miscanthus* grass. Kirkaldy (1910) listed it for southern China.

Melanophara dentata Haglund. Reported in Macau by Kirkaldy (1910) but it has not been collected in our study.

Nezara viridula (L.), the green vegetable bug. One of the most common insects found locally. Four colour varieties have been observed in recent years. Of a total of 460 specimens collected from the lights of the Friendship monument (Aug. 21–Sept. 8, 1996) an entirely green form comprized the majority of specimens (85% of 460). A second form characterized by a yellowish pronotum on a entirely green body accounted for 13% while a 3rd form yellow on the dorsal surface with green spots was the least abundant (1.5%).

Only one individual has been observed of the entirely yellow form which was characterized by Chen (1980) and entered a New Jersey Light trap on Taipa Island (1 Sept 1991). We believe Kirkaldy (1910) was the first to report the apparently all green form of this bug in Macau. Hosts of the insect are numerous including *Brassica campestris*, *B. oleracea*, *B. pekinensis*, *Oryza sativa* and *Azukia mungo*.

Piezodorus hydneri (Gmelin), the soybean stinkbug. 9 May 1996, ERE leg. Kirkaldy (1910) was first to record it locally. In Hong Kong it is reported from *Glycine max* or *G. soja* (Lee and Winney 1981).

Plautia fimbriata (F.), the string-bean stinkbug. 8–10/tree 25 June 1996, ERE leg, NEW RECORD, Taipa island, ex *Clerodendrum fragrens*, fragrant glorybower on hiking trail feeding on flowers. In Hong Kong it has been recorded feeding on *Vigna sesquipedalis*, yard-long bean as well as in the Guangdong region of China. It is also found in India, Sri Lanka, Burma, Malaysia and Japan.

Rhynchocoris humeralis (Thunberg), the citrus shield bug. 19 Nov. 1994, ERE leg, Friendship Monument, Macau peninsula August 1996, Coloane island NEW RECORD ex *Citrus sinensis*. Hoffman (1931b) studied its life history in the Guangzhou area of China and noted feeding on fruits in all stages of development causing fruit drop. It is found in India, Sri Lanka, Burma, Thailand, Hong Kong and the Hainan, Guangdong, Guangxi Fujian, Yunnan and Sichuan Provinces of China as well as Taiwan and Laos.

Stollia guttigera (Thunberg). 14 Sept. 1993, PWW leg, Coloane Island. Kirkaldy (1910) listed it earlier for Macau. Hosts include *Amaranthus gracilis*, *Arachis hypogaea*, *Avena fatua*, wild oats, *Celosia argentea*, wild coxcomb, and *Morus alba*. It is found in the Guangdong region of China.

Tetroda denticulifera Berggr, fork-headed stinkbug. 14 June 1993, Taipa island; 13 Sept. 1991, ERE leg, Ka-Ho village, Coloane island, NEW RECORD. In Hong Kong it has been recorded from *Oryza sativa*. Generic placement is considered to be *Tetrodias* according to Ahmad and Kama-luddin (1992).

Tolumnia latipes Walker. 27 April 1994, Cheong Pak Fai leg, Coloane Island, ex *Eucalyptus robusta*, swamp mahogany. Kershaw (in Kirkaldy 1910) may have recorded it both in Hong Kong and in Macau as *T. latipes* (Dallas). Distribution includes India,

Burma, Vietnam, Malaysia, Sumatra, Java, Taiwan and the Hunan, Zhejiang, Jiangxi, Hubei, Sichuan, Fujian, Guangxi, Yunnan and Guangdong provinces of China.

Udonga spinidens Distant. 6 April 1995, ERE leg, NEW RECORD, Friendship monument, Macau peninsula. It is widespread in China found in the Fujian, Hubei, Hunan, Guangxi, Guangdong, Shangxi and Yunnan provinces as well as Vietnam and Japan.

Zicrona caerulea L. Kershaw and Kirkaldy (1909b) reported it in Macau feeding on the chrysomelid beetle, *Haltica caerulea* Olivier but it was not found in the present study. In Hong Kong it has been recorded from *Oryza sativa* (Lee and Winney 1981). It is apparently widespread in China (Wu 1935) and found also in Burma (Myanmar), Malaysia, India (Assam), Pakistan, Borneo, Java, Sumatra, Vietnam and Taiwan.

Plataspidae

Brachyplatys subaeneus (Westwood). 1 June 1994, PWW leg, Coloane Island. Kershaw (1910) reported it feeding on the Kudzu vine, *Pueraria thunbergiana* in Macau and Hoffman (1931a) reported it on lima beans in the Guangdong region of China. It is also found in the Hainan province of China as well as India, Thailand, Cambodia, Malaysia, Burma, Borneo, Sumatra, Java, the Philippines and Taiwan.

Coptosoma cribraria (F.) (= *Megacopta cribraria* (F.)). 8 Aug. 1994, Cheong Chi Kong leg, Coloane Island. Kershaw (1910) reported it in Macau. It is believed to feed upon vetch, *Phaseolus radiatus*, and kidney beans, *P. vulgaris* in the Guangdong region of China. Also found in India, Sri Lanka, Burma, Thailand, Java, Sumatra, Hong Kong and Taiwan.

Coptosoma variegata Herrich-Schaeffer. 5 May 1994, Ip Tai leg, NEW RECORD, Coloane Island. Also found in India, Sri Lanka, Burma, Java, Borneo, Sumatra, Thailand and the Philippines (Wu 1935).

Pyrrhocoridae

Dindymus rubiginosus sanguineus (F.). 15 Nov., 9 Dec. 1990; 20 Jan. 1991 ERE

leg, Guia Hill on Macau peninsula. The first records of this bug in Macau were by Kershaw and Kirkaldy (1908a) who observed nymphs and adults feeding on thin-shelled gastropods, lepidopterous larvae, and hemipterans. Easton (1992) observed the bug feeding on a worker ant near the base of *Pawlownia fortunei*, Foxglove trees in a forested area on the Guia hill. Feeding also was noted on bugs of the same species at this site that may have first been injured or trampled by man. It is reported to occur in India (Assam), Burma, Thailand as well as Hong Kong (Wu, 1935).

Reduviidae

Ectomocoris apicimaculatus Distant. 7 Sept. 1995, ERE leg, NEW RECORD, Friendship Monument, Macau peninsula. It is also found in Hong Kong according to records at Tai Lung Experimental Station, Sheung Shui.

Ectomocoris atrox (Stal). 27 April 1993, Ng Wai Man leg, Coloane Island; 14 Sept. 1995, ERE leg, Friendship Monument, Macau peninsula, NEW RECORD. Hua (1984) recorded it from the Guangdong and Hainan provinces of China and Maldonado Capriles (1990) recorded it from Burma, Vietnam, Malaysia, Indonesia, India as well as China and the Philippines. This genus (Schuh & Slater 1995) consists of species that are ground-dwelling, and they are fast moving bugs that can inflict a painful bite to man.

Ectrychotes andreae (Thunberg). 2 April 1993, Tong Veng Va leg, NEW RECORD, Coloane Island. The bugs in the subfamily Ectrychodinae are believed to be obligate predators of millipedes (Louis 1974) and this species is found in the Guangdong and Hainan provinces of China (Hua 1984) as well as Taiwan, Korea, Japan and the Indochinese area (Maldonado Capriles 1990).

Oncocephalus impudicus Reuter. 14 Sept. 1995, 15 Feb. 1996, Friendship Monument, Macau peninsula; 30 Sept 1990, Univ. E. Asia, Taipa Island, ERE leg, NEW RECORD. Its distribution includes Borneo,

Java and Sumatra in Indonesia, Sri Lanka and the Guangzhou area (Guangdong) and Hainan provinces of China.

Polididus armatissimus Stål. 9, 14 Sept. 1995, ERE leg, NEW RECORD, Friendship Monument, Macau peninsula. Its distribution includes India, Sri Lanka, Burma (Myanmar) Vietnam, Malaysia and the Fujian, Jiangxi, Hubei, Zhejiang, Guangxi, Guangdong and Hainan provinces of China.

Scadra costalis (Lethierry). 4 June 1996, ERE leg, NEW RECORD, Coloane island crossing road on premises of the Macau Golf and Country Club near Hac-sa village. This genus is also believed to feed upon millipedes which are quite common locally.

Sycanus croceivittatus Dohrn. 12 Aug. 1996, ERE leg, on causeway between Taipa and Coloane islands. Kershaw (1909) discussed oviposition and development of this bug in South China (probably included Hong Kong and Macau) and Hill et al. (1982) in Hong Kong discussed it feeding when a nymph on snails. It is found in India and Burma as well as islands off the coast of Guangdong province and on Hainan island (Hua 1984).

Triatoma rubrofasciata (DeGeer). 23 Aug. 1995, ERE leg, Taipa island attracted to lights on the University campus. Easton (1992) noted several individuals under rocks on the ground surface near a rodent harborage. Usinger (1944) pointed out that even though its distribution is currently tropicopolitan it is considered an old world species and probably Indian in origin. It occurs in Hong Kong as well as Hainan island.

Tribelocephala walkeri China. 15 July 1972. Chan Chi Man leg, NEW RECORD, Coloane Island. It occurs in Hong Kong (Maldonado Capriles 1990) and Hua (1984) reported it from islands off the coast of the Guangdong province.

Tessaratomidae

Tessaratoma papillosa (Drury), litchi stinkbug. 11 Nov. 1992, Ng Wai Man leg, Coloane Island; 5 Sept. 1994, ERE leg, Tai-

pa island. Kershaw and Muir (1909) were probably the first to record it from Macau. It is common locally and in Hong Kong on both longan (*Euphoria longan*) and lychee, *Litchi chinensis* fruit trees where ever they occur. Considered a pest of fruit trees, biological control has been achieved by the mass rearing and release of an egg parasite, *Anastatus japonicus* Ashmead (Eupelmidae: Hymenoptera) in Hong Kong and in the Guangdong province of China as well as in Thailand (Napompeth 1992). It is also found in India, Sri Lanka, Burma, Thailand, Java, Sumatra and the Philippines.

Tingidae

Stephanitis pyrioides (Scott). azalea lace bug. 25 Mar. 1994, PWW leg, NEW RECORD, Coloane Island. In Hong Kong this species has been collected from *Rhododendron indicum* (Lee & Winney 1981), and there are records from Purple azaleae, *R. pulchrum*, in the Tai Lung farm entomology collection.

ACKNOWLEDGMENTS

The authors are much appreciative to Mr. Clive S. K. Lau, Plant Protection officer, Agriculture and Fisheries, Hong Kong Government, for allowing one of us (ERE) access to their insect collection on the Tai Lung Experimental Station near Sheung Shui, New Territories, Mr. Lau also arranged with The Natural History Museum, London to have identifications carried out, such as *Thunbergia* sp. of Lygaeidae that was determined by G. M. Stonedahl. We are indebted to Mr. António Júlio Emerenciano Estácio, Head of Agrarian services, Island government, for permission to use their facilities at Siac Pai Van. Species determinations of the gerrid and notonectid water bugs were made by Dr. Dan Polhemus, Smithsonian Institution, Washington, D.C.; identifications of pentatomids, in part, by Prof. Ghen Zhenyao, Research Institute of Entomology, Zhongshan University, Guangzhou, China, and identification of the Lygaeidae were made, in part, by Dr. James

A. Slater of the University of Connecticut, Storrs.

LITERATURE CITED

- Ahmad I. and S. Kamaluddin. 1992. New generic status of a rice-feeding Tetrodine subgenus, *Tetrodias* Kirkaldy and redescription of *Tetroda* Amyot and Serville and their cladistic analysis. *Pakistan Journal of Zoology* 24(2) 123–27.
- Ayyar, T. V. R. 1920. Notes on the life-history of *Cantao ocellatus*, Th. Report of the Proceedings of the Third Entomological Meeting, Pusa, III: 910–914. Calcutta Superintendent Government Printing, India.
- Chen, F. 1980. A new form of *Nezara viridula* (Linnaeus). *Entomotaxonomia* 2(1) 31–32. (In Chinese.)
- Chen, P-P. and N. M. Andersen. 1993. A Checklist of Gerromorpha from China (Hemiptera). *Chinese Journal of Entomology* 13: 69–75.
- Dudgeon, D. and R. Corlett. 1994. Hills and Streams, an ecology of Hong Kong. Hong Kong University Press. 234 pp.
- Durai, P. S. S. 1987. A revision of the Dinidoridae of the World (Heteroptera: Pentatomoidea). *Oriental Insects* 21: 163–360.
- Dolling, W. R. 1978. A revision of the Oriental pod bugs of the tribe Clavigrallini (Hemiptera: Coreidae). *Bulletin of the British Museum (Natural History), Entomology*. 36(6) 281–321.
- Easton, E. R. 1991. Annotated list of the insects of Macau observed during 1989. *Entomological News* 102(2): 105–11.
- Easton, E. R. 1992. 1990 additions to the annotated list of the insects of Macau. *Entomological News* 103(1): 30–36.
- Easton, E. R. 1993. The Insects of Macau. University of Macau publication Centre. 58 pp.
- Hill, D. S., P. Hore, and I. W. B. Thornton. 1982. Insects of Hong Kong. Hong Kong University Press. 503 pp.
- Hoffman, W. E. 1930. The food habits of *Erthesina fullo* (Thunb.) *Lingnan Science Journal* 9: 139–142.
- Hoffman, W. E. 1931a. Notes on Hemiptera and Homoptera at Canton Kwangtung province, Southern China, 1924–1929. Bureau of Entomology. United States Department of Agriculture Insect Pest Survey Bulletin 11: 138–151.
- Hoffman, W. E. 1931b. The life history of *Rhyncocoris lumeralis* Thunb. (Hemiptera: Pentatomoidea). *Lingnan Science Journal* 7: 817–820.
- Hoffman, W. E. 1933. Additional data on the life history of *Lethocerus indicus* (Hemiptera: Belostomatidae). *Lingnan Science Journal* 12: 595–601.
- Hoffman, W. E. 1935. An abridged Catalogue of certain Scutelleroidea (Plataspidae, Scutelleridae, and Pentatomidae) of China, Chosen, Indo-China and Taiwan. *Lingnan University Science Bulletin* Number 7, 294 pp.
- Hua Lizhong. 1984. A Check list of reduviid bugs of Guangdong Province (Hemiptera: Reduviidae). Institute of Entomology, Zhongshan University, Guangzhou, China. 18 pp. (In Chinese.)
- Kershaw, J. C. W. 1909. On the metamorphoses and anatomy of the reduviid bug, *Sycanus croceovittatus* Dohrn. *Annales de la Societe Entomologique de Belgique* 53: 241–249.
- Kershaw, J. C. W. 1910. On the metamorphoses of two coptosomine hemiptera from Macao. *Annales de la Société Entomologique de Belgique* 54: 69–73.
- Kershaw, J. C. W. and G. W. Kirkaldy. 1908a. Biological notes on Oriental Hemiptera, No. 1. *Journal of the Bombay Natural History Society* 18: 596–598.
- Kershaw, J. C. W. and G. W. Kirkaldy. 1908b. On the metamorphoses of two hemiptera-heteroptera from southern China. *Transactions of the Entomological Society of London*, pp 59–62.
- Kershaw, J. C. W. and G. W. Kirkaldy. 1909a. Biological notes on Oriental hemiptera II. *Journal of the Bombay Natural History Society* 19: 177–178.
- Kershaw, J. C. W. and G. W. Kirkaldy. 1909b. Biological notes on oriental Hemiptera III. *Journal of the Bombay Natural History Society* 19: 333–336.
- Kershaw, J. C. W. and G. W. Kirkaldy. 1909c. Biological notes on oriental hemiptera. IV. *Journal of the Bombay Natural History Society* 19: 571–573.
- Kershaw, J. C. W. and F. Muir. 1909. Life history of *Tessaratomya papillosa* Thunberg with notes on the stridulating organ and stink glands by Frederick Muir. *Transactions of the Entomological Society of London*, pp 253–258.
- Kirkaldy, G. W. 1910. A list of the Hemiptera of Oriental China, 2. *Annales de la Société Entomologique de Belgique* 54: 103–112.
- Lee, L. H. Y. and R. Winney. 1981. Checklist of Agricultural insects of Hong Kong 1981. Agriculture and Fisheries Department Bulletin No. 2, 164 pp.
- Louis, D. 1974. Biology of Reduviidae of cocoa farms in Ghana. *American Midland Naturalist* 91: 68–89.
- Maldonado Capriles, J. 1990. Systematic catalogue of the Reduviidae of the world (Insecta: Heteroptera). *Caribbean Journal of Science (special edition)*, 694 pp.
- Mukhopadhyay, A. 1988. Taxonomic study of Lygaeidae (Heteroptera: Insecta) from West Bengal (India). Records of the Zoological survey of India, Miscellaneous Publication Occasional paper No. 107, 72 pp., 12 plates.
- O'Shea, R. and C. W. Schaefer. 1980. A generic revision of the Asian and Australian Mictini (Heteroptera: Coreidae). *Oriental Insects* 14: 221–251.
- Napompeth, B. 1992. Brief survey of Biological Con-

- trol activities in Thailand. pp. 51-68. In Hirose, Y. ed., Biological control in South and East Asia. Kyushu University Press, Fukuoka, Japan.
- Sands, D. P. A. 1977. The Biology and ecology of *Leptocoris* in Papua New Guinea. Research Bulletin No. 18, Department of Primary Industry, Port Moresby. 104 pp.
- Schuh, R. T. and J. A. Slater. 1995. True bugs of the world (Hemiptera:Heteroptera) classification and natural history. Comstock Publishing, Cornell University Press, Ithaca. 336 pp.
- Thomas, D. B. 1994. Taxonomic synopsis of the Old World asopine genera (Heteroptera:Pentatomidae). *Insecta Mundi* 8 (3-4): 145-212.
- Usinger, R. L. 1944. The Triatominae of North and Central America and the West Indies and their public health significance. United States Public Health Service Bulletin 288, 83 pp. 11 plates.
- Wu, C. F. 1935. *Catalogus Insectorum Sinensium* (Catalogue of Chinese Insects). Volume II. Fan Memorial Institute of Biology, Peiping, China. 634 pp.